Auditory streaming at the cocktail party

Simultaneous neural and behavioral studies of auditory attention

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Competing Auditory Streams





Foreground & Background



Two Competing Streams





Target rate: 4Hz Target rove:250-500 Hz Duration: 5.5 s Protection Zone: 8 st Band: 5 Oct @ 353 Hz Tone dur: 75 ms Target dev: +/- 2 st Masker dev: 400 ms



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Masker Condition

Time

Frequency

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Psychophysical Performance





Two Stream Paradigm



Psychophysical Performance



Foreground & Background



Response to Target

Neural Response to Target Target Task





Attention Modulates Response to Target



Two Competing Streams



Attention Modulates Competing Streams



Attention Modulates Competing Streams



Neural Enhancement by Frequency

Coherence Enhancement by Frequency

Target rate: 4Hz Target rove:250-500 Hz Duration: 5.5 s Protection Zone: 8 st Band: 5 Oct @ 353 Hz Tone dur: 75 ms Target dev: +/- 2 st Masker dev: 400 ms

Target Behavioral & Neural Build-ups

Target Task

Target Behavioral & Neural Build-ups

Behavioral & Neural Build-ups

Build up of 4 Hz Stream

Behavioral & Neural Build-ups

Build up of 4 Hz Stream

Neural Buildup Via Synchrony

Behavioral & Neural Build-ups

Build up of 7Hz Stream

Time after Sequence Onset (seconds)

Summary

- Strong Neural Response to Target & Both Streams
- Attention strongly modulates Neural Response & Phase Coherence
- Change in Behavior correlates with Change in

Neural Response

+ Buildup of Neural Response correlates within subjects

with Behavioral Buildup (for Slow Stream Only)

Thank You

Target Hemispheric Asymmetry Flips (Foreground/Background)

Right Hemisperic Advantage (Two Streams)

Neural Response to Target Difference across Hemispheres (R-L)

Attention Modulates Phase Coherence

MEG Measures Neural Currents

An Alternative to Time: Frequency

• Use Stimuli localized in Frequency, not time

- Examine Response at Same Frequency
- Steady State Response (SSR)
- Frequency Response/Transfer Function

Whole Head Steady State Response

Complex Equivalent–Current Dipoles

